Investigation on fluid properties of small, medium and large array size of beams oscillating in fluids

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An array of beams are finding a wide range of applications in fluid environments such as in, atomic force microscopy, sensors, biology and medicine. Therefore it is important to investigate the effect of fluid properties, when an array of beams oscillate in a fluid environment.

In this work we investigate the overall hydrodynamics of arrays distinguish between sizes of small, medium and large. We are using a well-known closed-form analytical formulation derived from boundary integral method. The analysis is carried out for the velocity configuration of all beams oscillating in an unbounded fluid. We investigate the arrays for different gaps between the beams at different Reynolds numbers.

First results suggest a classification of fluid effects for small to large array sizes (see figure) at critical gaps between the beams for different Reynolds numbers.

Keywords: Array effects, Hydrodynamic loading, Reynolds number and boundary integral method.

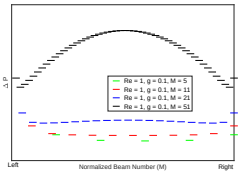

Figure 1: Comparison of hydrodynamic profile for different array sizes